

Nutrient balances of energy, lysine and nitrogen in late gestating and early lactating sows

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Introduction

During the transition period (D -10 to + 10).....

- **Foetuses and reproductive organs develop fast**
- **Sow energy balance becomes negative (anabolic -> catabolic metabolism)**
- **At parturition: Drop in LW, increase in ME-requirement**
- **Colostrum is produced and secreted**
- **Milk production begins and yield increases day by day**
- **Heat production increases due to colostrum/milk synthesis**
- **Diet is changed from gestation to lactation diet**

We need to focus on traits which **quantitatively** affects nutrient requirements – e.g. mammary and foetal growth

Day 105



1097 g

Day 114



1560 g

Aim of project:

To quantify the requirements and balances of energy, lysine, and nitrogen for sows during transition:

Ultimate goal:

- **Improve sow productivity**
- **Minimise sow mobilisation during lactation**
- **Reduce feed intake over a reproductive cycle**

Method:

Sow requirements of energy, lysine, and nitrogen were calculated factorially:

Foetal growth (Noblet et al., 1985)

Uterus, placenta, fluids and membranes (Noblet et al., 1985)

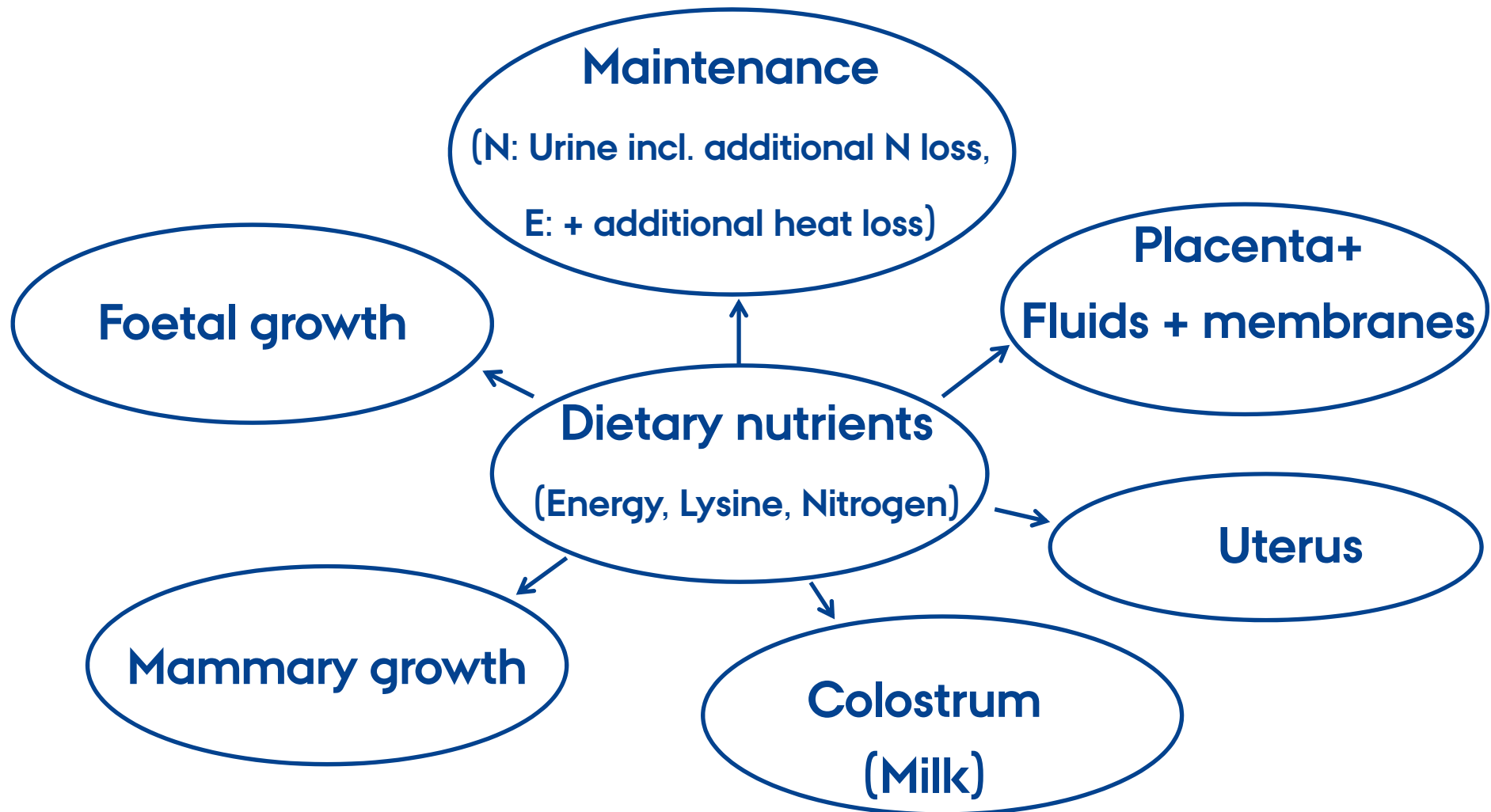
Mammary growth (Kim et al., 2000)

Milk yield and composition (Hansen et al., 2012)

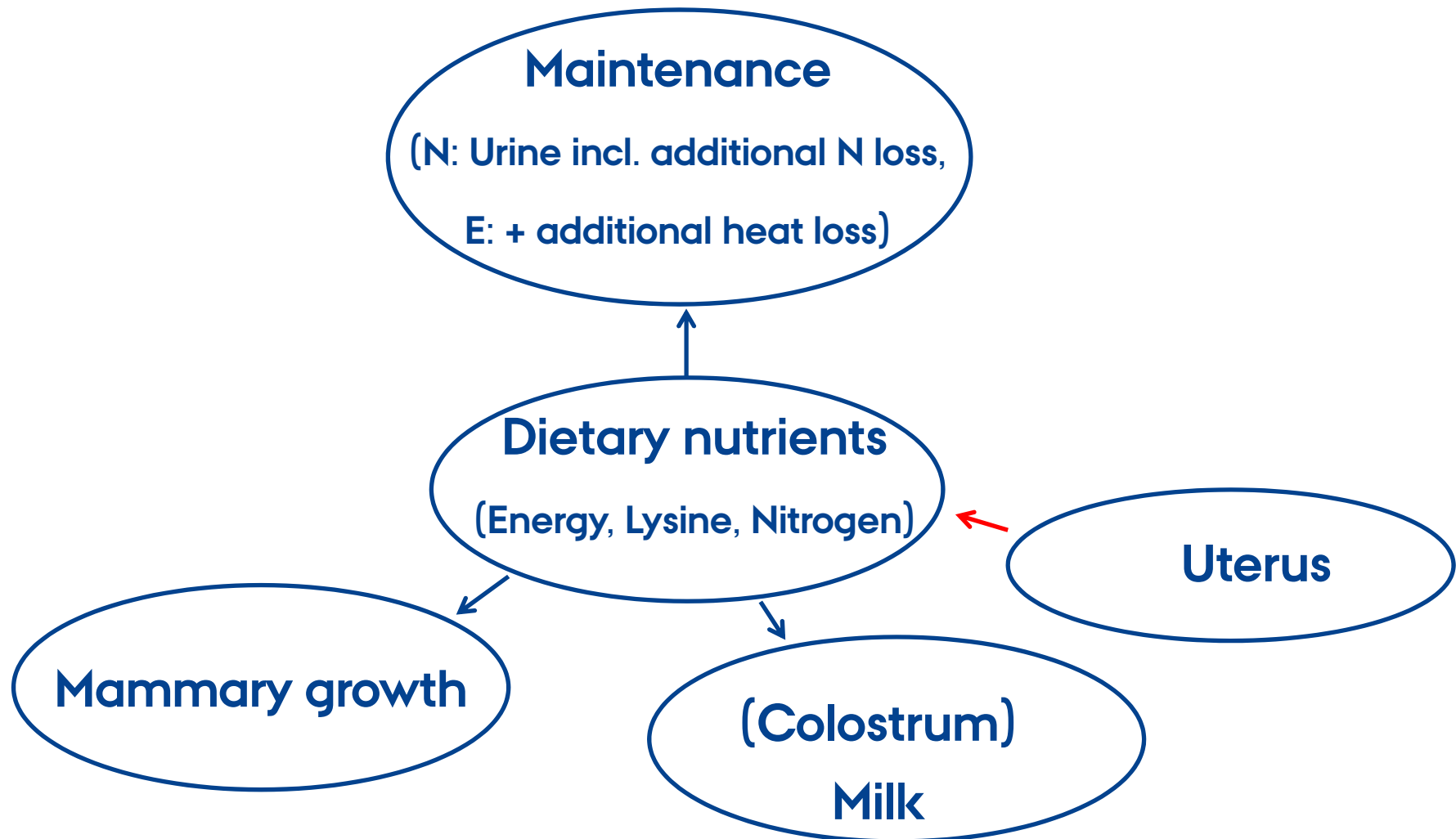
Maintenance (Theil et al., 2002, 2004, NRC 2012)

Colostrum yield and composition (Theil et al., submitted)

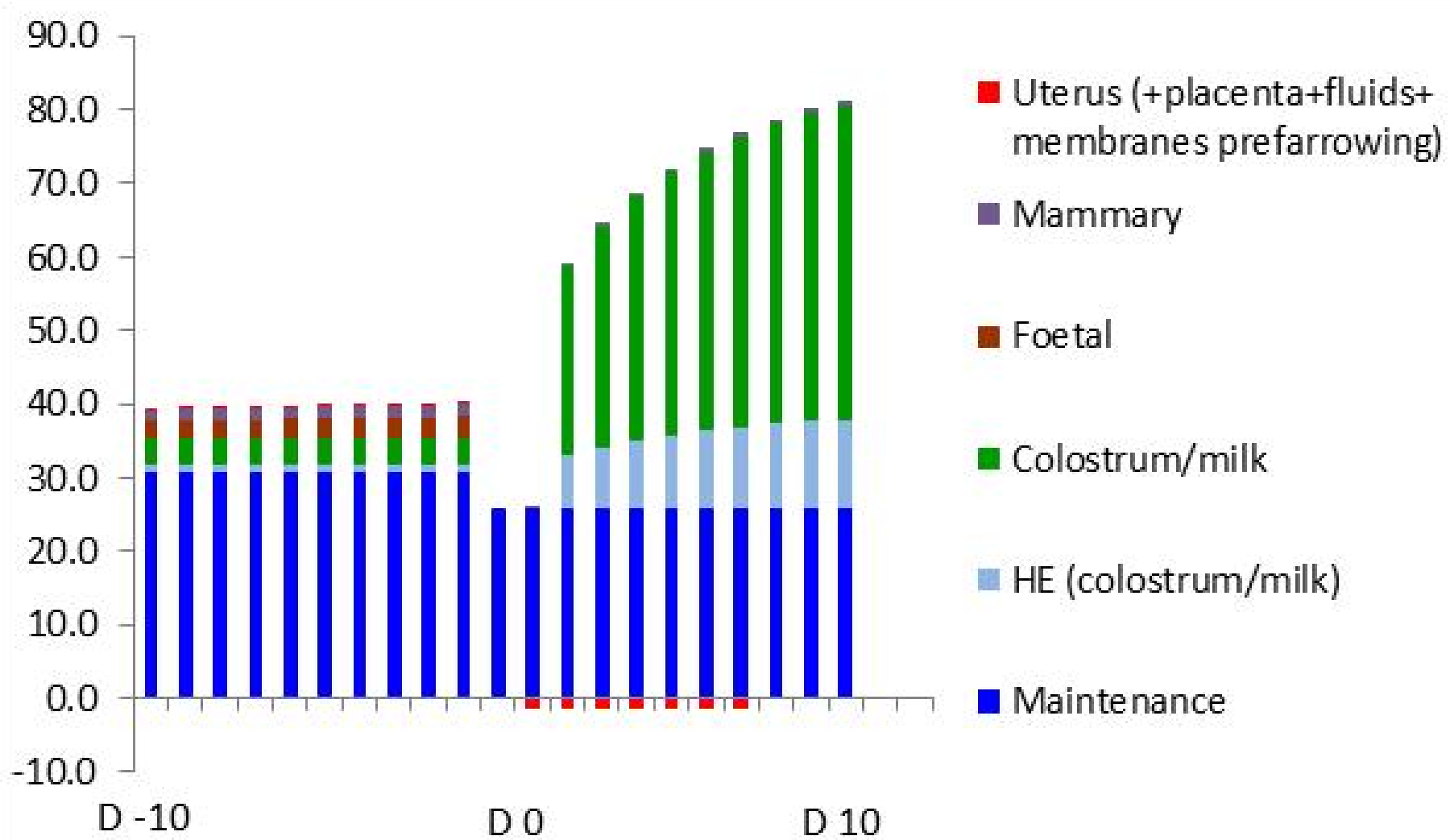
Nutrient requirement during **late gestation** (ass. no mobilization)



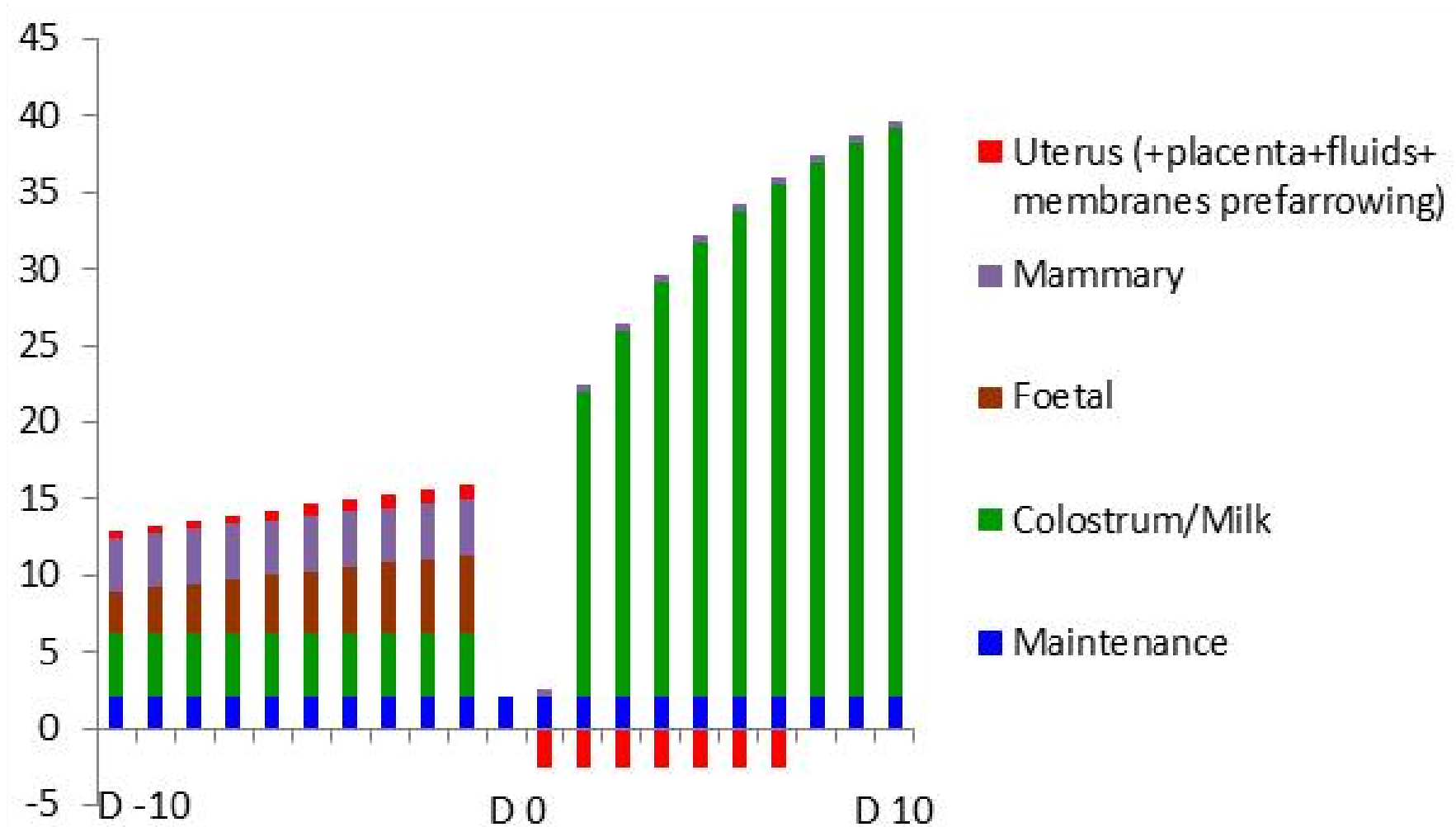
Nutrient requirement during **early lactation** (ass. no mobilization)



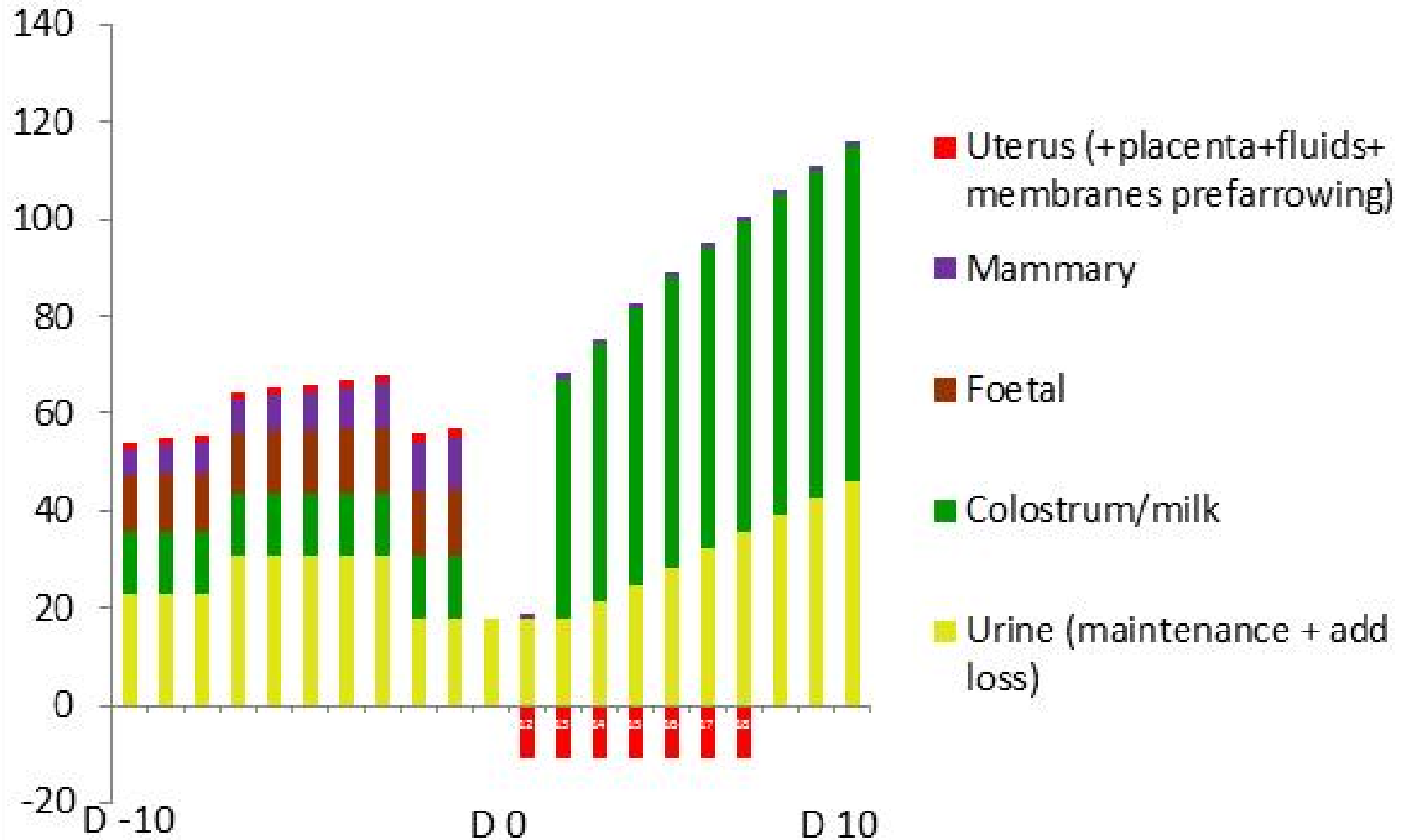
Energy requirement during transition (MJ ME/d)



Lysine requirement during transition (g/d)



Nitrogen requirement during transition (g/d)



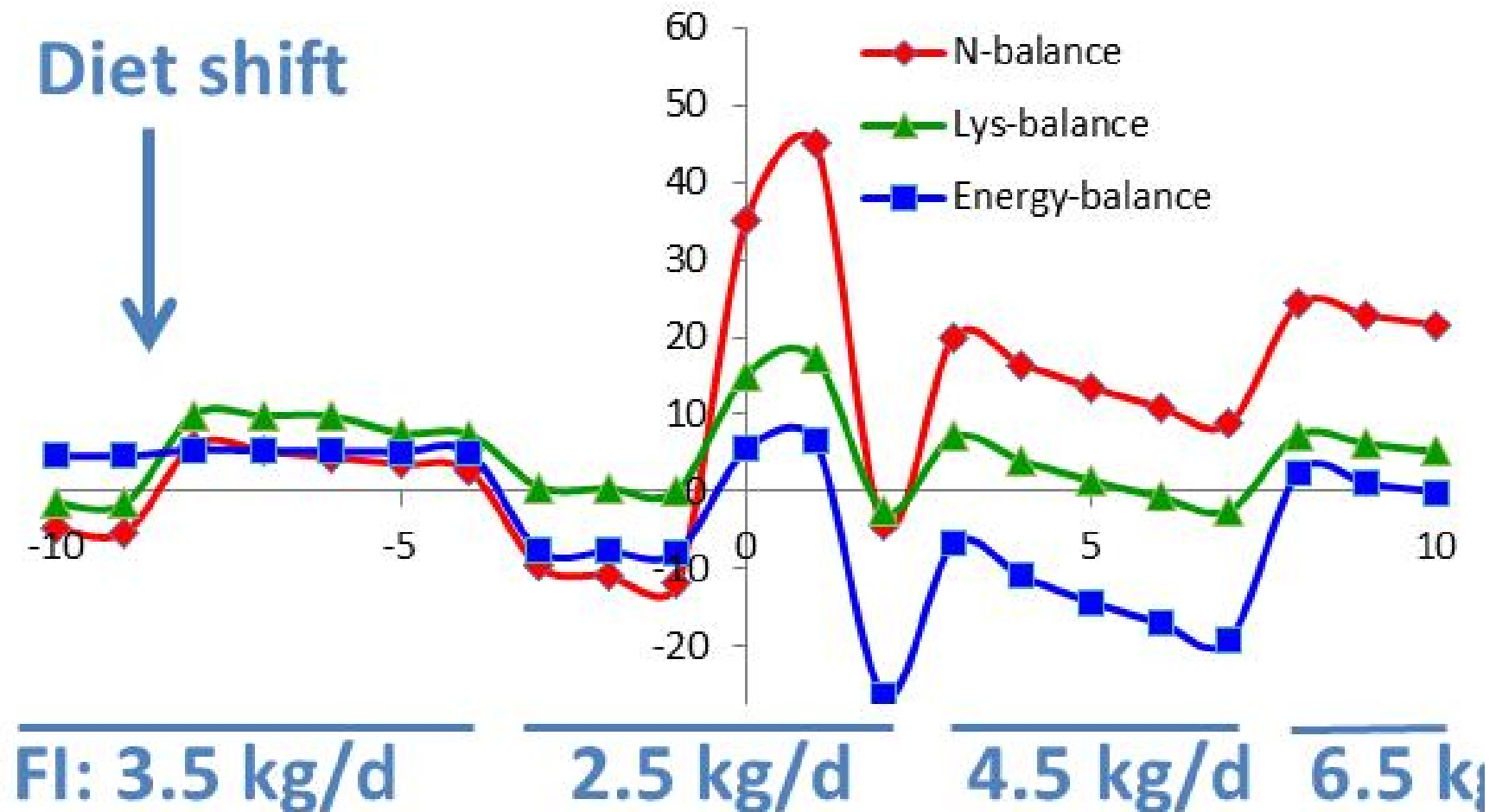
Requirements at d 105

Energy	39 MJ ME/d
Lysine	13 g/d
Nitrogen	54 g/d

Relative requirements of energy and lysine (d 105 = index 100)

	Energy	Lysine	Nitrogen
Day 105	100	100	100
Day 114	102	124	105
Day 10	206	309	214

Nutrient balances during transition

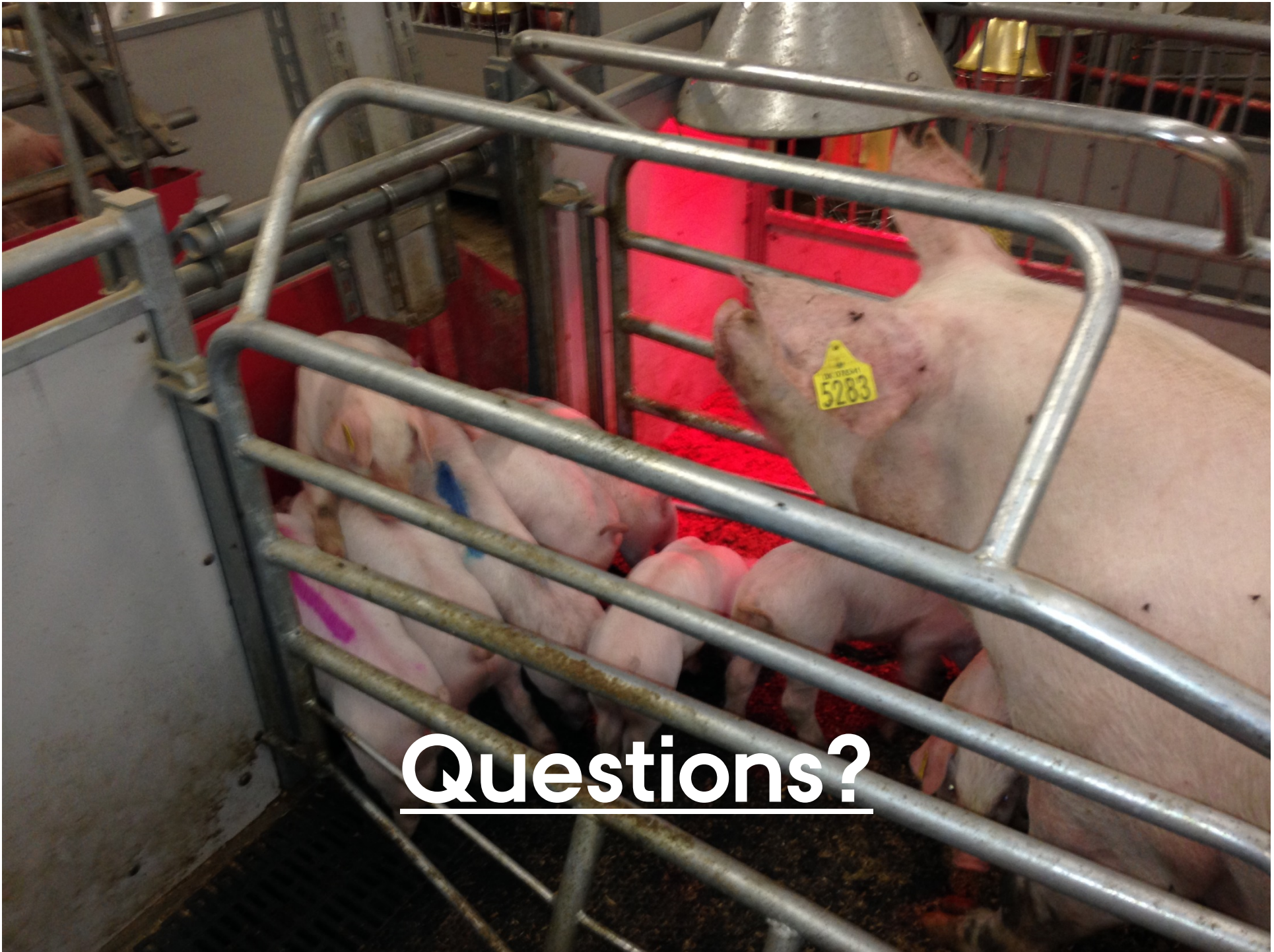


Conclusions

Requirements/utilization change dramatically during transition

Limiting factors: Nitrogen before parturition (?), energy in early lactation (and lysine at peak lactation)

A two diet feeding strategy to transition sows can much better target the rapidly changing requirements than a single diet can



Questions?